

Prof. Dr. Markus Quante
Curriculum Vitae



Regional modelling of chemistry transport in a changing climate
Scientific coordinator of the *North Sea Region Climate Change Assessment (NOSCCA)*
Member of the Cluster of Excellence *Climate Climatic Change and Society (CliCCS)* at the Universität of Hamburg

Affiliation

Helmholtz-Zentrum Hereon, Member of the Helmholtz Association
Institute of Coastal Environmental Chemistry

Address: Max-Planck-Straße 1
D-21502 Geesthacht, Germany
Phone: ++49 4152 872378
FAX: ++49 4152 872332
Email: markus.quante@hereon.de

Honorary Professor at Leuphana University Lüneburg, Germany

Education

Academic Secondary School: Märkisches Gymnasium, Hamm/Germany

Diploma in Environmental Technology, University of Applied Science,
Münster/Germany

Diploma in Meteorology, University of Cologne, Cologne/Germany
(Secondary subject: Atmospheric Chemistry)

Doctorate (Dr. rer. nat.), University of Hamburg, Hamburg/Germany

Employment

1982-1983	Industrial Trainee, British Gas Corporation, Wind Tunnel Lab., Watson House Research Center, London/UK
1984-1989	Graduate Assistant, Institute for Geophysics and Meteorology, University of Cologne/Germany
1989-1990	Research Scientist, Institute for Geophysics and Meteorology, University of Cologne/Germany
1990-1996	Research Scientist, Institute for Physics, GKSS Research Centre, Geesthacht/Germany
1996-2001	Research Scientist, Institute for Atmospheric Physics, GKSS Research Centre
2001 to 2003	Head of the Atmospheric Measurements Department
2002-present	Senior Research Scientist, Institute for Coastal Research, Helmholtz-Zentrum Geesthacht (now Hereon)

Professional activities

Consulting / Expert Report for: UK-Natural Environment Research Council (NERC), Dutch Climate Research Programme, University of Electro-Communications Tokyo (UEC), US-Department of Energy (DOE), Finnish Environmental Institute

Science Team member of the CloudSat-Mission, NASA Jet Propulsion Laboratory, Pasadena

Member of the Advisory Committee "European Research Course on Atmospheres" University Joseph Fourier, Grenoble

Member of the Steering Group on Climate Change, International Council for the Exploration of the Sea, ICES, 2009 to 2011

Scientific Coordinator of the North Sea Region Climate Change Assessment (NOSCCA)

User Group Selection Panel of European Fleet for Airborne Research (EUFAR)

Member of European Fleet for Airborne Research (EUFAR): Expert Group on Turbulence;

Member of European Fleet for Airborne Research (EUFAR): Expert Group on Active Remote Sensing;

Member of the Advisory Board "Warnsignale Klima – Wissenschaftler informieren direkt"

Member of the German Meteorological Society (DMG);

Member of Vereinigung Deutscher Wissenschaftler (VDW e.V.)

Reviewer for international scientific journals as: Journal of Geophysical Research, Geophysical Research Letters, Journal of the Atmospheric Sciences, Journal of Applied Meteorology, Quarterly Journal of the Royal Meteorological Society, Atmospheric Research, Climate Research, Atmospheric Chemistry and Physics, Annales Geophysicae, Meteorologische Zeitschrift, Environmental Science & Technology, Earth System Science, Atmospheric Pollution Research, Atmospheric Chemistry and Physics, Journal of Navigation, Marine Pollution
Guest Editor: Atmospheric Chemistry and Physics

Teaching Activities

In the centre of the teaching activities are more than 20 years of uninterrupted lectures on *Environmental Meteorology* and *Urban and Vegetation Climate* at the Leuphana University of Lüneburg/Germany.

Lectures at the Leuphana University of Lüneburg:

2014 to present	Responsibility in Science, Leuphana Semester
2008 to present	Global Change Modelling, MSc. Sustainability Science
2008 to present	Climate Change and Ecology, MSc. Sustainability Science
2010 to present	Transport of matter in the Atmosphere, BSc. Env. Sciences
2020 to present	Transport of Matter, MSc Sustainable Chemistry, Profess. School
2019 to present	Stadtklima im Klimawandel, Seminar, Leuphana Semester
2012 to 2015	Sustainability and Journalism, Certificate Studies
1990 to 2008	Environmental Meteorology
1991 to 2008	Urban Meteorology and Vegetation Climate
1993 to 1999	The Atmosphere, University of Applied Science, Lower Saxony, Suderburg (now Leuphana University Lüneburg)
2008, 2009	Climatology, Leuphana University Lüneburg/Suderburg (MSc Course Trop. Water Management)

- 2013 “Urban Climate and Climate Change”, Global Classroom – University of Arizona and University of Lüneburg
- 2013 “Climate Change – Science, Models and Scientists”
“Climate Engineering” in “Science Takes Responsibility”,
Leuphana Semester

Lecturer at National and International Courses

- 2004 to present European Research Course on Atmospheres (ERCA), Université Grenoble Alpes, Grenoble/France
(lecturer and advisory committee)
- 1995 NATO Advanced Science Institute „Remote Sensing of Processes Governing Energy and Water Cycles in the Climate System”, Plön/Germany
- 1998 Autumn School on *Radar Meteorology*, German Aerospace Center, Oberpfaffenhofen/Germany
- 2002 Summer School on “*Coastal Seas, System Analysis and Monitoring*”, IOW, Warnemünde/Germany
- 2002 Postgraduate Summer Course “*Coastal Environmental Surveying*”, University of Kiel/Germany
- 2004 Postgraduate Summer Course “*Coastal Environmental Surveying*”, University of Kiel/Germany
- 2005 Autumn School on “*Radar Meteorology*”, University of Munich (LMU)/Germany
- 2007 5th GKSS School on Environmental Research, “*Persistent Pollution – Past, Present, Future*”, GÖhrde/Germany (initiator and lecturer)

Invited talks

(selection) Penn State University, State Collage/USA; Oregon State University, Corvallis/USA; University of Utah, Salt Lake City/USA; Optical Society of America, Baltimore/USA; University of Hokkaido, Sapporo/Japan; Communication Research Lab., Kashima/Japan; Communication Research Lab., Tokyo/Japan; University of Tohuko, Sendai/Japan; University of

Hannover/Germany; German Aerospace Center, Oberpfaffenhofen/Germany; Institute for Tropospheric Research (IfT), Leipzig/Germany; IFM/Geomar, University of Kiel/Germany; University of Lüneburg/Germany; University of Hamburg/Germany, University of Manchester (UMIST)/UK; University Blaise Pascal, Clermont Ferrand/France; University of Oslo/Norway; Ev. Akademie Loccum/Germany; TU Darmstadt, Germany, Wadden Sea Forum, and public lectures on climate, clouds, and water cycle issues (e.g. Heinrich Böll Stiftung).

Stipends and Awards

Stipend award by „Prof. Dr. Koepchen Stiftung“, RWE

Stipend by Ruhrgas AG, Essen, for Research Visit to British Gas Research Laboratory, Watson House, London/UK

Stipend from NATO for a Summer Semester at University of Washington, Seattle/USA, Atmospheric Sciences (1986)

Young Scientist Award, „Freunde und Förderer des GKSS Forschungszentrum e.V.“, Geesthacht/Germany

Research Interests (Keywords)

- Environmental meteorology and global change
- Impacts of climate change
- Regional climate change
- Chemistry transport modelling
- Deposition of air pollutants and nutrients
- Atmospheric turbulence
- Clouds and climate
- Urban climate and air quality

Publications (selected from different topic areas)

Quante, M. B. Gasparini und B. Belge, 2023: Vom Regenmachen zur Klimaintervention - Ein Blick auf die Ideen- und Entwicklungsgeschichte des Climate Engineering. Kapitel 1.3 in Lozán, J.L., H. Graßl, S.-W. Breckle, D. Kasang und M. Quante (HRSG.): *WARNSIGNAL KLIMA: Hilft Technik gegen die Erderwärmung? Climate Engineering in der Diskussion*. Wissenschaftliche Auswertungen, Hamburg.

Quante, M., und T. Leisner, 2023: Das Strahlungsmanagement im Climate Engineering – ein Überblick. Kapitel 5.1 in Lozán, J.L., H. Graßl, S.-W. Breckle, D. Kasang und M. Quante (HRSG.): *WARNSIGNAL KLIMA: Hilft Technik gegen die Erderwärmung? Climate Engineering in der Diskussion*. Wissenschaftliche Auswertungen, Hamburg, 221-229.

Possner, A., J. Quaas und M. Quante, 2023: Impfen von Wolken zur Erhöhung der Reflektivität – Konzepte, Potentiale und Risiken. Kapitel 5.5 in Lozán, J.L., H. Graßl, S.-W. Breckle, D. Kasang und M. Quante (HRSG.): *WARNSIGNAL KLIMA: Hilft Technik gegen die Erderwärmung? Climate Engineering in der Diskussion*. Wissenschaftliche Auswertungen, Hamburg, 249-254.

Gasparini, B., M. Quante und U. Lohmann, 2023: Ausdünnung von Zirren um dem Klimawandel entgegenzuwirken? Kapitel 5.6 in Lozán, J.L., H. Graßl, S.-W. Breckle, D. Kasang und M. Quante (HRSG.): *WARNSIGNAL KLIMA: Hilft Technik gegen die Erderwärmung? Climate Engineering in der Diskussion*. Wissenschaftliche Auswertungen, Hamburg, 255-262.

Lozán, J.L., H. Graßl, S.-W. Breckle, D. Kasang und M. Quante (HRSG.), 2023: *WARNSIGNAL KLIMA: Hilft Technik gegen die Erderwärmung? Climate Engineering in der Diskussion*. Wissenschaftliche Auswertungen, Hamburg, 330pp.

Schwarzkopf, D.A., R. Petrik, J. Hahn, L. Ntziachristos, V. Matthias and M. Quante, 2023: Future Ship Emission Scenarios with a Focus on Ammonia Fuel. *Submitted to Atmosphere*

Feldner, J., M.O.P. Ramacher, M. Karl, M. Quante and M. Luttkus, 2022: Analysis of the effect of abiotic stressors on BVOC emissions from urban green infrastructure in northern Germany. *Environ. Sci.: Atmos.*, DOI: 10.1039/D2EA00038E.

Lauenburg, M., Karl, M., Matthias, V.; Quante, M., Ramacher, M.O.P., 2022: City Scale Modeling of Ultrafine Particles in Urban Areas with Special Focus on Passenger Ferryboat Emission Impact. *Toxics*, 10, 3. <https://doi.org/10.3390/toxics10010003>

Schwarzkopf, D.A., Petrik, R., Matthias, V., Quante, M., Yu, G., Zhang, Y., 2022: Comparison of the Impact of Ship Emissions in Northern Europe and Eastern China. *Atmosphere* 2022, 13, 894, <https://doi.org/10.3390/atmos13060894>

Meier, H. E. M., Kniebusch, M., Dieterich, C., Gröger, M., Zorita, E., Elmgren, R., Myrberg, K., Ahola, M., Bartosova, A., Bonsdorff, E., Börgel, F., Capell, R., Carlén, I., Carlund, T., Carstensen, J., Christensen, O. B., Dierschke, V., Frauen, C., Frederiksen, M., Gaget, E., Galatius, A., Haapala, J. J., Halkka, A., Hugelius, G., Hünicke, B., Jaagus, J., Jüssi, M., Käyhkö, J., Kirchner, N., Kjellström, E., Kulinski, K., Lehmann, A., Lindström, G., May, W.,

Miller, P., Mohrholz, V., Müller-Karulis, B., Pavón-Jordán, D., Quante, M., Reckermann, M., Rutgersson, A., Savchuk, O. P., Stendel, M., Tuomi, L., Viitasalo, M., Weisse, R., and Zhang, W., 2022: Climate Change in the Baltic Sea Region: A Summary, *Earth Syst. Dynam.*, 13, 457–593, <https://doi.org/10.5194/esd-13-457-2022>

Schwarzkopf, D.A., R. Petrik, V. Matthias, M. Quante, E. Majamäki, J.-P. Jalkanen, 2021: A ship emission modeling system with scenario capabilities. *Atmospheric Environment X* 12 (2021) 100132.

Matthias, V., Quante, M., Arndt, J. A., Badeke, R., Fink, L., Petrik, R., Feldner, J., Schwarzkopf, D., Link, E.-M., Ramacher, M. O. P., and Wedemann, R., 2021: The role of emission reductions and the meteorological situation for air quality improvements during the COVID-19 lockdown period in central Europe, *Atmos. Chem. Phys.*, 21, 13931–13971, <https://doi.org/10.5194/acp-21-13931-2021>

Moldanová, J., Hassellöv, I.-M., Matthias, V., Fridell, E., Jalkanen, J.-P., Ytreberg, E., Quante, M., Tröltzsch, J., Maljutenko, I., Raudsepp, U., and Eriksson, K.M., 2021: Framework for the environmental impact assessment of operational shipping. *Ambio*, online 22 July. <https://link.springer.com/content/pdf/10.1007/s13280-021-01597-9.pdf>

Quante, M., Karl, M., Matthias, V., Moldanova J., and Ramacher M., 2021: Shipping in the Baltic Sea: Assessment of Current and Future Air Quality Implications. *em - The Magazine for Environmental Managers - A&WMA - February 2021*

Ramacher, M.O.P., V. Matthias, A. Aulinger, M. Quante, J. Bieser, M. Karl, 2020: Contributions of traffic and shipping emissions to city-scale NO_x and PM_{2.5} exposure in Hamburg. *Atmospheric Environment*, 237, 117674.

Matthias, V., Bieser, J., Mocanu, T., Pregger, T., Quante, M., Ramacher, M. O. P., Seum, S., and Winkler, C., 2020: Modelling road transport emissions in Germany Current day situation and scenarios for 2040. *Transportation Research Part D: Transport and Environment*, 87:102536.

Hoffmann, P., Y. Nomaguchi, K. Hara, K. Sawai, I. Gasser, M. Albrecht, B. Bechtel, J. Fischereit, K. Fujita, P. Gaffron, C. Krefis, M. Quante, J. Scheffran, K.H. Schlünzen, M. von Szombathely, 2020: Multi-Domain Design Structure Matrix Approach applied to Urban System Modeling. *Urban Science*, 4, 28; doi:10.3390/urbansci4020028

Quante M., V. Matthias & M. Ramacher, 2019: Städtische Luftqualität im Klimawandel. In: Lozán J. L. S.-W. Breckle, H. Grassl, W. Kuttler & A. Matzarakis (Hrsg.). *Warnsignal Klima: Die Städte*. pp. 120-127

Callies, U., R. Carrasco, J. Floeter, J. Horstmann, and M. Quante, 2019: Submesoscale dispersion of surface drifters in a coastal sea near offshore wind farms, *Ocean Science*, 15, 865-889, <https://doi.org/10.5194/os-15-865-2019>.

Karl, M., J. E. Johnson, A. Uppstu, A. Aulinger, M. Prank, J.-P. Jalkanen, L. Johansson, M. Quante, V. Matthias, 2019: Effects of ship emissions on air quality in the Baltic Sea region simulated with three different chemistry transport models. *Atmos. Chem. Phys.*, 19, 7019–7053.

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Hess, C., T. Niemeyer, A. Fichtner, K. Jansen, M. Kunz, M. Maneke, H. von Wehrden, M. Quante, D. Walmsley, G. von Oheimb, W. Härdtle, 2018: Anthropogenic nitrogen deposition alters growth responses of European beech (*Fagus sylvatica* L.) to climate change. *Environmental Pollution, Environmental Pollution*, 233, 92-98.

Feichter, J., M. Quante, 2017: From predictive to instructive: Using models for geoenvironment. In M. Heymann, G. Gramelsberger, M. Mahony (eds.): Cultures of Prediction: Epistemic and Cultural Shifts in Environmental Science, Routledge, London, 178-194.

Schumann, U., Baumann, R., Baumgardner, D., Bedka, S. T., Duda, D. P., Freudenthaler, V., Gayet, J.-F., Heymsfield, A. J., Minnis, P., Quante, M., Raschke, E., Schlager, H., Vázquez-Navarro, M., Voigt, C., and Wang, Z., 2017: Properties of individual contrails: a compilation of observations and some comparisons, *Atmos. Chem. Phys.*, 17, 403-438, doi:10.5194/acp-17-403-2017.

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Neumann, D., Matthias, V., Bieser, J., Aulinger, A., and Quante, M., 2016: A comparison of sea salt emission parameterizations in northwestern Europe using a chemistry transport model setup, *Atmos. Chem. Phys.*, 16, 9905-9933, doi:10.5194/acp-16-9905-2016, 2016.

Matthias, V.; Aulinger, A.; Bieser, J.; Chen, Y.; Geyer, B.; Gao, J.; Quante, M., Zhang, F., 2016: Modeling high aerosol loads in China in January 2013, *Urban Climate*, 22, 35-50.

Quante, M., Colijn, F., Bakker, J.P., Härdtle, W., Heinrich, H., Lefebvre, C., Nöhren, I., Olesen, J.E., Pohlmann, T., Sterr, H., Sündermann, J., and Tölle, M.H., 2016: Introduction to the Assessment—Characteristics of the Region. In M. Quante and F. Colijn (eds.), *North Sea Region Climate Change Assessment*, Regional Climate Studies. Springer International Publishing, Cham, Switzerland, 1 - 54

Quante, M. and Bjørnæs, C., 2016: Emission Scenarios for Climate Projections. In M. Quante and F. Colijn (eds.), *North Sea Region Climate Change Assessment*, Regional Climate Studies. Springer International Publishing, Cham; Switzerland, 515-524.

Quante, M., F. Colijn (eds.), 2016: *North Sea Region Climate Change Assessment*. Springer International Publishing, Cham; Switzerland, 528pp.

Aulinger, A., V. Matthias, M. Zeretzke, J. Bieser, M. Quante, and A. Backes, 2016: The impact of shipping emissions on air pollution in the Greater North Sea region. Part I: Current emissions and Concentrations. *Atmos. Chem. Phys.*, **16**, 739-758.

Matthias, V., A. Aulinger, A. Backes, J. Bieser, B. Geyer, M. Quante, and M. Zeretzke, 2016: The impact of shipping emissions on air pollution in the Greater North Sea region. Part II: Scenarios for 2030. *Atmos. Chem. Phys.*, **16**, 759-776

Backes, A., A. Aulinger; J. Bieser; V. Matthias; M. Quante, 2016: Ammonia emissions in Europe, Part I: Development of a dynamical ammonia emission inventory. *Atmos. Env.*; **131**, 55-66.

Backes, A., A. Aulinger; J. Bieser; V. Matthias; M. Quante, 2016: Ammonia emissions in Europe, Part II: How ammonia emission abatement strategies affect secondary aerosols. *Atmos. Env.*, **126**, 153-161.

Quante, M., 2015: Anmerkungen über die Eiswolken und ihre Bedeutung. In: Lozán, J. L., H. Grassl, D. Kasang, D. Notz und H. Escher-Vetter (Hrsg.). Warnsignal Klima: Das Eis der Erde. pp. 99-103.

Matthias, V., A. Aulinger, J. Bieser, B. Geyer, M. Quante, 2014: Air pollution in China January 2013. *D. Steyn, R. Mathur (eds.) Air Pollution Modeling and Its Application XXIII, Springer Publishing.* 211-218

Aulinger, A., V. Matthias, J. Bieser, M. Quante, 2014: Effects of future ship emissions on the North Sea air quality. *D. Steyn, R. Mathur (eds.) Air Pollution Modeling and Its Application XXIII, Springer Publishing.* 295-300.

Meinke, I., M. Maneke, J. Klepken, M. Quante, 2013: Klimawandel in Nordost-Niedersachsen unter besonderer Berücksichtigung des Hitzesommers 2003. *Jb. Naturw. Verein Fstm. Lbg.*, **45**, 9-21.

Härdtle W, Niemeyer T, Assmann T, Aulinger A, Baiboks S, Fichtner A, Friedrich U, Lang AC, Neuwirth B, Pfister L, Quante M, Ries C, Schuldt A, Simon N, von Oheimb G, 2013. Long-term trends in tree-ring width and isotope signatures ($\delta^{13}\text{C}$, $\delta^{15}\text{N}$) of *Fagus sylvatica* L. on soils with contrasting water supply. *Ecosystems* **16**: 1413-1428.

Vik, A., M. Quante, J. Moldanova, and V. Matthias, 2012: A GEOSS perspective on Air Quality and Health in Europe: the EGIDA Methodology. *Earthzine*, 26 November 2012.

Hermans, A., F. Ament, B. Geyer, V. Matthias, M. Quante, and B. Rockel, 2012: Evaluation of Humidity, Clouds and Precipitation in COSMO-CLM and MM5 over Germany. *Meteorologische Zeitschrift*, **21**, 487 -502.

Yang, H., J.S.E. Dobbie, G.G. Mace, A. Ross, M. Quante, 2012: GEWEX Cloud System Study (GCSS) cirrus cloud working group: development of an observation-based case study for model evaluation. *Geosci. Model Dev.*, **5**, 829-843.

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of winter 2003 PM episodes over Europe. In Steyn, D.G., and S. Trini Castelli (eds.): *Air Pollution Modelling and its Application XXI*. NATO Science for Peace and Security Series C: Environmental Security 4, Springer Science + Business Media, 499-503.

Quante, M., A. Aulinger, und V. Matthias, 2011: Der Schifftransport und sein Beitrag zum Klimawandel. In J. Lozán, H. Graßl, L. Karbe und K. Reise, *Warnsignal Klima: Die Meere - Änderungen und Risiken*. Wissenschaftliche Auswertungen, Hamburg, ISBN 978-39809668-5-2, 286-293.

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Quante, M., R. Ebinghaus, and G. Flöser (eds.), 2011: *Persistent Pollution - Past, Present, Future*. Springer Verlag, Berlin, 417pp. Authors: F. Adams, A. Aulinger, C. Barbante, N. Berrojalbiz, M. Bolshov, C. Boutron, P. Brimblecombe, P. Cescon, G. Cozzi, J. Dachs, R. Ebinghaus, H. Elbern, V. Hellwig, H. Helmholtz, C. Ferrari, E. Friese, C. Galban, P. Garbrielli, R. Giola, H. Graßl, H. Hintelmann, S. Hong, S.-D. Hur, A. Jahnke, K. Jones, R. Khaiwal, V. Matthias, L. Mejanelle, L. Nieradzki, L. Nizzetto, J. Pacyna, W. Palm, J. Plane, M. Quante, K. Rosman, H. von Storch, A. Strunk, N. Theobald, C. Turetta, P. Vallelonga, S. del Vento, Z. Xie.

Holliday, N.P., M. Quante, T. Sherwin, G. Nolan, K.-A. Mork, H. Cannaby, and D. Berry, 2011: North Atlantic circulation and atmospheric forcing. In Reid, P. C., and Valdés, L. (eds.): ICES status report on climate change in the North Atlantic. ICES Cooperative Research Report No. 310, 5-20.

Holliday, N.P., S.L. Hughes, K. Borenäs, R. Feistel, F. Gaillard, A. Lavín, H. Loeng, K.-A. Mork, G. Nolan, M. Quante, and R. Somavilla 2011: Long-term physical variability in the North Atlantic Ocean. In Reid, P. C., and Valdés, L. (eds.): ICES status report on climate change in the North Atlantic. ICES Cooperative Research Report No. 310, 21-46.

Holliday, N.P., S.L. Hughes, M. Quante, and B. Rudels, 2011: Sea level rise and changes in Arctic sea ice. In Reid, P. C., and Valdés, L. (eds.): ICES status report on climate change in the North Atlantic. ICES Cooperative Research Report No. 310, 47-58.

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Bieser, J., Aulinger, A., Matthias, V., Quante, M., Builtjes, P., 2011: SMOKE for Europe – Adaptation, modification and evaluation of a comprehensive emission model for Europe. *Geoscientific Model Development*, **4**, 47-68.

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